

# THE DETERMINANTS INFLUENCING COGNITIVE BEHAVIOUR OF VEGETABLE GROWERS IN THE USE OF PLANT PROTECTION CHEMICALS

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## ABSTRACT

*Cognitive behaviour in the context of this study refers to the various facets of buying and usage behaviour of farmers, including frequency of buying the plant protection chemicals, source of information influencing the buying decision of farmers, point of purchase, factors affecting choice of purchase point. The current study examined correlates farmers' cognitive behaviour in the use of plant protection chemicals. Data were collected from 105 horticultural farmers of seven village of Oddanchathram block of Dindugal district, Tamil Nadu. It was noted that cognitive behaviour in the use of plant protection chemicals was related to multiple vegetable crops like tomato, brinjal, okra, bhendi etc. Findings comprise of the major factors influencing the cognitive behaviour of the farmers. Educational status, innovativeness and availability of plant protection chemicals and perceived economic benefits have major influence over the cognitive behaviour of farmers in the use of plant protection chemicals.*

**KEYWORDS:** Cognitive Behaviour, Plant Protection Chemicals, Horticultural Crops & Determinants

Original Article 1

**Received:** Mar 09, 2019; **Accepted:** Mar 29, 2019; **Published:** Apr 24, 2019; **Paper Id.:** IJASRJUN201914

## INTRODUCTION

India is presently the largest manufacturer of basic plant protection among the South Asian and African countries, with the exception of Japan. The Indian pesticides market is the 12th largest in the world with a value of US\$0.6 billion, (Hundalet *al.*, 2006). Although Indian average consumption of pesticide is far lower than many other developed economies, the problem of pesticide residue is very high and has also affected the export of agricultural commodities in the last few years (Abhilash and Nandita Singh 2009). Fruits and vegetable crops receive a considerably high quantity of pesticides, and with a cropped area of three per cent, they consume 13 per cent of the total pesticides in the country (Nigam and Murthy, 2000). The effect of chemical pesticide-use is more harmful in vegetables. These problems have necessitated the search for safer and effective methods of pest control, including behavioural (use of attractants, e.g. pheromone traps), biocontrol and botanical pesticides. Their use, however, has limitations and chemical control continue to be the preferred strategy in practice. The Exposure of different information and adoption of new plant protection chemicals is assumed to develop farmers' cognitive behaviour.

Cognitive behaviour in the use of plant protection chemicals refers to the act of the farmers in obtaining and using plant protection chemicals and the decision process that determines these acts. The buying decision is a set of many decisions, which may involve a product, brand, style, quality, dealer, time, price and a way to pay (Deep, 2009). Cognitive behaviour in this study refers to the various facets of buying and usage behaviour of farmers, including frequency of buying the plant protection chemicals, source of information influencing the buying decision of farmers, point of purchase, factors affecting choice of purchase point.

## MATERIALS AND METHODS

Dindigul district is well known for its vegetable production in Tamil Nadu. Approximately eight per cent of the total vegetable production of Tamil Nadu hails from Dindigul district. The district is known for mixed ecosystem which comprises of dry land, wet land, garden land and hill based cropping systems, wherein a variety of vegetables are being grown. *Ex post facto* research design was followed for the study. Seven villages namely Ambiligai, Kethayurumbu, Puliyurnatham, Veriyapur, Puliamarathukottai, Kappaliapatti, Javatupatti were selected based on the maximum area of production. Among the total vegetable growing farmers (1,732), six per cent was taken as sample for the study *i.e* 105 farmers. Purposive Random Sampling was employed to derive the sample from each village. The dependent variable selected for the study is cognitive behaviour which has been divided into seven components, namely mass media / information support contribution, frequency of purchase of plant protection chemicals, point of purchase factors influencing choice of purchase point, information looked for on the package attributes affecting brand choice and perception of farmers regarding price, quality and brand. The relationship between cognitive behaviour and profile of the respondents were analyzed using correlation and multiple linear regression and the results are discussed below.

## RESULTS AND DISCUSSIONS

Cognitive behaviour of farmers in the use of plant protection chemicals shows the act of the farmers in obtaining and using plant protection chemicals and the decision process that determines these acts. The correlation and regression analysis were applied to ascertain the relationship of independent variable with the cognitive behaviour of farmers and presented in the Table 1

**Table 1: Relationship of Independent Variable with Cognitive Behaviour of Farmers in the use of Plant Protection Chemicals**

Variable No.	Variables	Correlation Coefficient	Regression Coefficient	Standard Error	't'
	Constant		-8.479	5.243	-1.617
X <sub>1</sub>	Age	0.018	0.002	0.026	0.027
X <sub>2</sub>	Educational status	0.582**	0.235	0.184	2.939*
X <sub>3</sub>	Farming experience	-0.108	-0.003	0.023	-0.030
X <sub>4</sub>	Size of land holdings	-0.112	-0.088	0.050	-1.227
X <sub>5</sub>	Mass media participation	0.291**	0.067	0.109	0.933
X <sub>6</sub>	Extension participation	0.154	0.012	0.214	0.159
X <sub>7</sub>	Cosmopoliteness	-0.137	0.010	0.267	0.154
X <sub>8</sub>	Innovativeness	0.604**	0.327	0.104	4.321
X <sub>9</sub>	Consultancy pattern	0.172	0.045	0.334	0.643
X <sub>10</sub>	Decision making ability	-0.097	-0.004	0.240	-0.065
X <sub>11</sub>	Risk taking ability	-0.050	-0.005	0.239	-0.083
X <sub>12</sub>	Possession of plant protection equipments	0.466**	-0.028	0.165	-0.325

Table 1: Contd.,					
X <sub>13</sub>	Availability of plant protection chemicals	0.653**	0.313	0.324	3.875*
X <sub>14</sub>	Cost incurred on equipment, chemicals and labours	0.161	0.079	0.000	1.211
X <sub>15</sub>	Perceived Economic Benefits	0.516**	0.184	0.139	2.421*

\* Significance at 0.05 level R<sup>2</sup>=0.672

\*\* Significance at 0.01 level

Multiple regression analysis was taken up to find out the contribution of the independent variable to the cognitive behaviour among the respondents. The R<sup>2</sup> value was 0.672. The R<sup>2</sup> value, has shown that all the variables contributed 67.20 per cent variation in cognitive behaviour in the use of plant protection chemicals among the respondents.

Therefore, the equation was worked out and given below.

$$Y_1 = -8.479 + 0.002 (X_1) + 0.235 (X_2) - 0.003 (X_3) - 0.088 (X_4) + 0.067 (X_5) - 0.012 (X_6) + 0.010 (X_7) + 0.327 (X_8) + 0.045 (X_9) - 0.004 (X_{10}) - 0.005 (X_{11}) - 0.028 (X_{12}) + 0.313 (X_{13}) + 0.079 (X_{14}) + 0.184 (X_{15}).$$

The results indicated the variables viz., educational status, innovativeness and availability of plant protection chemicals have shown positive contribution at one per cent level of probability. Perceived economic benefits have shown positive contribution at the five per cent level of probability. The remaining variables did not contribute to cognitive behaviour among the respondents.

Results revealed that one unit increase in the following independent variable viz., educational status (X<sub>2</sub>), innovativeness (X<sub>8</sub>), availability of plant protection chemicals (X<sub>13</sub>) and perceived economic benefits (X<sub>15</sub>) had increased the cognitive behaviour level by 0.235 and 0.327, 0.313 and 0.184 units respectively.

Nearly two-thirds of the respondents were found to have middle to collegiate level of education. This might be the probable reason for medium level of cognition among farmers. Education inevitably influence the cognitive behaviour of the respondents in the use of plant protection chemicals. It is an endorsed fact that educated farmers always understand the subtle changes in plant protection chemicals usage and its influence in farming swiftly than illiterate farmers and were able to take back up measures to endure with the bizarre situation of crop damage. Most of the educated farmers used to amend their knowledge on plant protection measures from input dealers apart from farm publications and electronic resources. So the cognitive behaviour of farmers upsurged with the upsurption in the knowledge and awareness on latest plant protection chemicals.

Higher the innovativeness of the farmers, higher will be their cognitive behaviour. Due to the emergence of pest resurgence combined with disease capacity of the crops, a farmer should possess some level of innovativeness, to try new plant protection chemicals and formulation hardly as recommended by input dealers. This is because of the fact that vegetables are perishable and short duration crops, so the farmers prefer to use new plant protection chemicals for immediate and efficient control of crop damage and yield loss. This might be the viable reason for the positive contribution of innovativeness with the cognitive behaviour of farmers in the use of plant protection chemicals. In the present study, farmers were found to have a medium level of innovations which obviously resulted in medium level of cognitive behaviour.

Availability of plant protection chemicals has a significant positive contribution to the cognitive behaviour of farmers in the use of plant protection chemicals. Availability of plant protection chemicals is essential for timely application of plant protection measures. In such cases, farmers travel even to nearby towns or cities to get access to these plant protection chemicals as they give more importance to some attributes of plant protection chemicals like quality, self-efficacy, familiar brands etc., This might be the possible reason for the positive contribution of availability of plant protection chemicals with the cognitive behaviour of farmers in the use of plant protection chemicals.

Based on the result and perceived economic benefits significantly shows positive affect towards the cognitive behaviour of the respondents in the use of plant protection chemicals. It might also be due to the innovativeness in the use of plant protection chemicals. If farmers face significant reduction of crop damage due to trying out new chemical, it ultimately will result in higher yield as well as better economic benefits. Hence, it could be concluded that if the perceived economic benefits increase, the farmers' cognition in the use of plant protection chemicals will improve.

## CONCLUSIONS

Cognitive behaviour in the use of plant protection chemicals was inevitable in vegetable cultivation. Educational status, innovativeness and availability of plant protection chemicals and perceived economic benefits are the factors which greatly influenced the cognitive behaviour of farmers in the use of plant protection chemicals. From this study, it is suggested that in order to improve the cognitive behaviour of farmers, more thrust has to be given to the above mentioned factors.

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